

RCRA REVISION CHECKLIST 55

Statistical Methods for Evaluating Ground-Water Monitoring
Data from Hazardous Waste Facilities
53 FR 39720-39731
October 11, 1988
(Non-HSWA Cluster V)

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE

PART 264 - STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

SUBPART F - RELEASES FROM SOLID WASTE MANAGEMENT UNITS

REQUIRED PROGRAMS

definition of "detected" as in 264.98(f)	264.91(a)(1)
definition of "exceeded" as in 264.99(d)	264.91(a)(2)

GROUND-WATER PROTECTION STANDARD

replace "entering" after 264.93 with "detected in"; in the last clause replace everything after "constituents have" with "been detected in the ground water."	264.92
remove "and" from end of paragraph	264.97(a)(1)
redesignate 264.97(g)(3) as 264.97(a)(1)(i); sampling of wells not hydraulically upgradient	264.97(a)(1)(i)
old 264.97(g)(3)(i) becomes 264.97(a)(1)(i)(A); insert "hydraulic- ly" preceding "up- gradient"; replace "or" at end of paragraph with "and"	264.97(a)(1)(i)(A)

RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
old 264.97(g)(3)(ii) becomes 264.97(a)(1)(i)(B); add "; and " to end of paragraph	264.97(a)(1)(i) (B)				
contamination detec- tion when migration to uppermost aquifer	264.97(a)(3)				
detection monitoring --sampling procedure, number and kinds of samples, sample size	264.97(g)				
sequencing of at least four samples; requirements of interval between	264.97(g)(1)				
alternate sampling procedure	264.97(g)(2)				
redesignate as 264.97(a)(1)(i)	264.97(g)(3)				
specify statistical evaluation methods for ground-water data and specify in permit; requirements for use of listed methods:	264.97(h)				
parametric ANOVA followed by multiple comparisons procedures	264.97(h)(1)				
ANOVA based on ranks followed by multiple comparisons procedures	264.97(h)(2)				
tolerance or predic- tion interval procedure	264.97(h)(3)				
control chart approach	264.97(h)(4)				
another statistical method approved by the Regional Administrator	264.97(h)(5)				

**RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)**

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
performance standards for statistical methods chosen under 264.97(h):	264.97(i)				
appropriate for distribution of chemical parameters or hazardous constituents; transformed or distribution-free test	264.97(i)(1)				
individual well comparison--0.01 Type I error; multiple comparisons--0.05 Type I error, but maintain 0.01 Type I error for individual wells	264.97(i)(2)				
for control chart approach, what must be approved by Regional Administrator	264.97(i)(3)				
for tolerance or prediction interval, what must be approved by Regional Administrator	264.97(i)(4)				
account for data below detection limit and requirements	264.97(i)(5)				
procedures to correct or control for seasonal and spatial variability	264.97(i)(6)				
maintenance of ground-water monitoring data in facility operating record; when data must be reviewed	264.97(j)				
DETECTION MONITORING PROGRAM					

RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
ground-water monitor- ing program for each chemical parameter and hazardous con- stituent; record of ground-water analytical data	264.98(c)				
Regional Administra- tor specifies fre- quency of samples and tests; four samples per well semi-annually	264.98(d)				
determine if statistically sig- nificant evidence of contamination	264.98(f)				
methods which can be used	264.98(f)(1)				
determine evidence of contamination at each monitoring well at compliance point; time period deter- mined by Regional Administrator	264.98(f)(2)				
what owner/operator must do if sta- tistically significant evidence of contamination	264.98(g)				
notification of Regional Administrator	264.98(g)(1)				
immediate determina- tion if Appendix IX constituents are in ground water	264.98(g)(2)				
for constituents found, resample in one month; if con- firmed, form basis of compliance moni- toring; no resample-- initial analysis is basis	264.98(g)(3)				

RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
application for permit modification	264.98(g)(4)				
1 Appendix IX					
constituent concentration	264.98(g)(4)(i)				
proposed changes to ground-water monitoring system	264.98(g)(4) (ii)				
proposed additions or changes	264.98(g)(4) (iii)				
proposed concentra- tion limit or notice of intent for alternate concentration limit	264.98(g)(4) (iv)				
what must be sub- mitted within 180 days	264.98(g)(5)				
data to justify alternate concen- tration limit	264.98(g)(5)(i)				
engineering feasibility plan for corrective action	264.98(g)(5)(ii)				
concentration of 264.98(g)(2) con- stituents does not exceed values of Table 1, 264.94	264.98(g)(5)(ii) (A)				
alternate concen- tration limit	264.98(g)(5)(ii) (B)				
demonstration that a source other than regulated unit caused contamination	264.98(g)(6)				
notify Regional Administrator of intent to submit demonstration	264.98(g)(6)(i)				
report demonstrating that another source caused contamination or error in sampling, analysis or evaluation	264.98(g)(6)(ii)				

RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
application for permit modification	264.98(g)(6)(iii)				
continue to monitor	264.98(g)(6)(iv)				
what must be done if detection monitoring program no longer satisfies requirements	264.98(h)				
delete paragraph	264.98(i)				
delete paragraph	264.98(j)				
delete paragraph	264.98(k)				
COMPLIANCE MONITORING PROGRAM					
Regional Admin- istrator specifies procedures and statistical methods	264.99(c)				
sampling program for each chemical parameter or hazard- ous constituent	264.99(c)(1)				
records of ground- water analytical data	264.99(c)(2)				
statistical evidence of increased contam- ination of any chemical parameter or hazardous constituent	264.99(d)				
method(s) to deter- mine statistically significant evidence of increased contamination	264.99(d)(1)				

RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)

		STATE ANALOG IS:			
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
within reasonable time period, deter- mine if statis- tically significant evidence of increased contamination at each monitoring well at compliance point	264.99(d)(2)				
Regional Administrator specification of sample and test frequencies; four samples per well semi-annually	264.99(f)				
annual analysis at each well's compli- ance point for all 264, Appendix IX constituents; pro- cedures regarding new constituents not in permit	264.99(g)				
remove old 264.99(h) and redesignate old 264.99(i) as 264.99(h); revise new 264.99(h)-- change "(h)" to "(d)"; replace "the ground-water protec- tion standard" with "any concentration limits under 264.94 are"; insert "or she" after "he"	264.99(h)				

RCRA REVISION CHECKLIST 55: Statistical Methods for Evaluating Ground-
Water Monitoring Data from Hazardous Waste Facilities (cont'd)

			STATE ANALOG IS:		
FEDERAL REQUIREMENT	FEDERAL RCRA CITATION	ANALOGOUS STATE CITATION	EQUIV- ALENT	MORE STRINGENT	BROADER IN SCOPE
redesignate old 264.99(j) as 264.99(i); revise new 264.99(i)-- change "(h)" to "(d)"; replace "protection standard" with "concentration limits under this section are"; insert "or she" after "he"; revise rest of paragraph after "regulated unit caused" retaining clause "In making demonstration..."	264.99(i)				
redesignate old 264.99(k) as 264.99(j)	264.99(j)				
redesignate as 264.99(j) so that 264.99(k) no longer exists	264.99(k)				
remove paragraph	264.99(l)				

¹ Note in line 2 there is a typographical error--"or" should be "of."